

YRD-W100 User's Manual



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■ Document Revision

Date	Version	Author
2014-04-26	V1.0	Jacky Lee
2015-03-02	V1.1	Jacky Lee

1. INTRODUCTION

1.1 DESCRIPTION

野人電科技的 W100 嵌入式設備連網伺服器是特別為了串列設備能夠簡易的快速連上雲端而設計。

應用於實際產品時，可以選擇 AT Command Mode ,MODBUS Gateway Mode 或 Direct Mode, 不管那種模式都只要簡易幾個步驟就可以輕易的讓原有的串列產品連上網路。藉助 Cortex-M3 系統晶片的強大運算力量，W100 支援 IEEE 802.11 b/g/n、高達 230400 Kbps 的串列傳輸率、多樣化且立即可用的標準操作模式，並且只需要少量的電源。

這樣的方案能幫助客戶縮短開發時間，節省板子空間，容易認證，而且不需要太多的 RF 經驗。

利用野人電科技研究團隊創新技術，W100 可用於將任何具有標準串列介面的設備即時轉換為具備無線網路功能。



1.2 FORM FACTOR

Type: Pin header module

Dimensions: 42.5 x 25 x 2 mm

Weight: 3 g

1.3 SYSTEM INFORMATION

- **MCU** **STM32 ARM 32-bit Cortex™-M3 Frequency up to 120 MHz**
- **Diverse serial interface** **USART**
- **Sensor applications support** **ADC, I2C, I2S, GPIO, CAN bus, 8-bit parallel**
- **On-chip functionality Single-chip** **MAC/BB/RF**
- **Frequency Band** **2.4 GHz**
- **Transmit Power** **+17 dBm @b mode/11 Mbps**
- **MIN Receiver Sensitivity** **-96 dBm**
- **Network Standard** **802.11b, 802.11g, 802.11n (single stream)**
- **Modulation Modes** **CCK and OFDM with BPSK, QPSK, 16 QAM, 64QAM**
- **Hardware Encryption** **WEP, WPA/WPA2**
- **Supported Data Rates**
 - IEEE 802.11b 1 – 11 Mbps**
 - IEEE 802.11g 6 – 54 Mbps**
 - IEEE 802.11n (2.4 GHz) 7.2 – 72.2 Mbps**
- **Operating Temperature** **-40℃ to 85℃**
- **MSL level 3**
- **Certification** **FCC and CE compliant**





1.4 SERIAL INTERFACE

Number of Ports: 1

Transmission Format: Standard TTL

1.5 SERIAL COMMUNICATION PARAMETERS

Data Bits: 8

Stop Bits: 1

Parity: None /Even /Odd

Flow Control: None

Baud rate: 2400 /4800 /9600 /19200 /38400 /57600/ 115200 /230400 Kbps

1.6 SERIAL SIGNALS

TTL: TXD, RXD, GND

TTL: RS485 direction control

1.7 DIGITAL I/O PINS

GPIO: 32 configurable I/O pins

UART *3 /SPI *1 /I2C *1 /ADC *5 /CAN *1 /GPIO

1.8 SOFTWARE

Network Protocols: ICMP, ARP, IP, TCP, UDP, DHCP, HTTP, SNMP V1, SMTP, TFTP

Configuration Options: Web console, Device search windows AP

Work Mode: AT command mode / MODBUS gateway mode / Direct mode supported

Upgrade : Firmware / Web upgrade over Ethernet

Communication Protocol: AT command set supported



1.9 ENVIRONMENTAL LIMITS

Operating Temperature:

Standard Models: 0 to 55°C (32 to 131°F)

Wide Temp. Models: -40 to 85°C (-40 to 185°F)

Storage Temperature (package included): -40 to 60°C (-40 to 140°F)

Ambient Relative Humidity: 5 to 95% (non-condensing)

1.10 POWER REQUIREMENTS

Input Voltage: 3.3 VDC ($\pm 5\%$)

Power Consumption: 120 mA @ 3.3 VDC input max.

1.11 WARRANTY

Warranty Period: 1 years

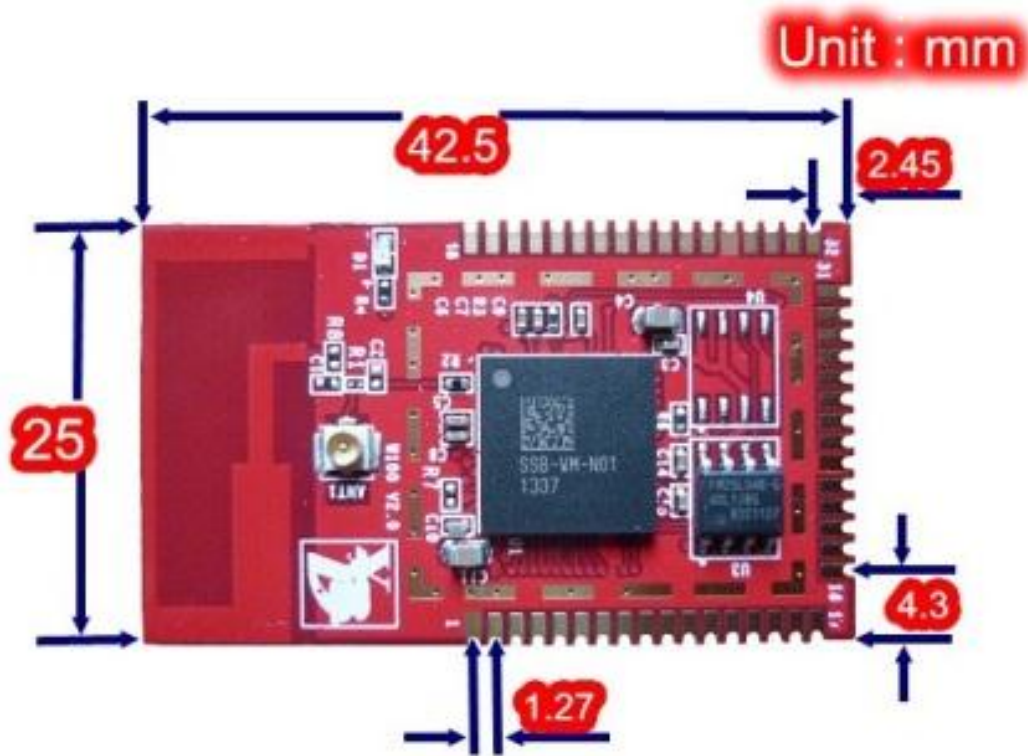
Details: See www.yerendian.com

1.12 WHERE TO USE W100



1.13 DIMENSION

Unit: mm



1.14 PIN ASSIGNMENT-1

Main Pins (20 Pins)		
Pin	Signal Name	Function
1	GND	GND
2	PH8	Reset to Default
3	PH9	GPIO
4	PH10	GPIO
5	PH11	GPIO
6	PH12	GPIO
7	PH14	GPIO
8	UART1-TX /PA9	System Reserve
9	UART1-RX /PA10	System Reserve
10	32K Clock IN	System Reserve
11	UART2-TX /PD5	Communication Port TX
12	UART2-RX /PD6	Communication Port RX
13	SPI1-MOSI /PA7	SPI1 /GPIO
14	SPI1-MISO /PA6	SPI1 /GPIO
15	SPI1-CLK /PA5	SPI1 /GPIO
16	PA4	GPIO



17	PA_PWR	Power (+3.3Vdc)
18	PB14	GPIO
19	PB15	GPIO
20	PB10	GPIO
21	GPIO-1	System Reserve
22	GPIO-2	System Reserve
23	GND	GND
24	VCC	Power (+3.3Vdc)
25	TMS	System Reserve
26	TCK	System Reserve
27	NC0	System Reserve
28	TDI	System Reserve
29	TDO	System Reserve
30	TRSTN	System Reserve
31	#RESET	Reset
32	PH15	GPIO
33	PH13	GPIO
34	NC1	System Reserve
35	NC2	System Reserve

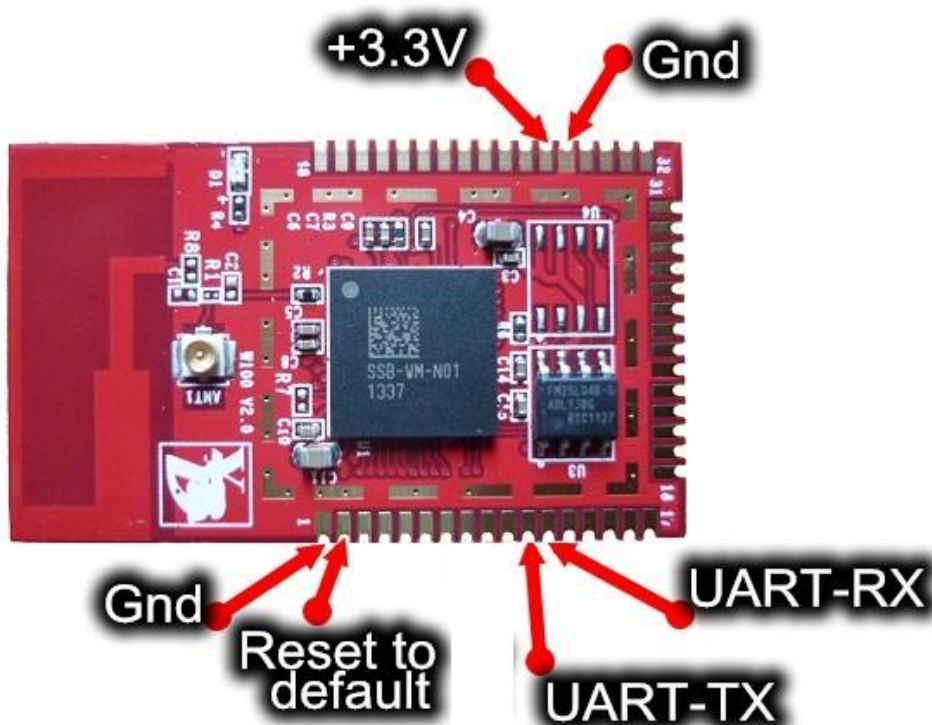


36	GND	GND
37	VCC	Power (+3.3Vdc)
38	I2C1-CLK /PB6	I2C1 /GPIO
39	I2C1-DAT /PB7	I2C1 /GPIO
40	PI4	GPIO
41	PI5	GPIO
42	PI6	GPIO
43	PI7	GPIO
44	PF9	GPIO
45	PA0	GPIO
46	PA1	GPIO
47	PA2	RS485 Direction
48	PA3	GPIO

2. GETTING STARTED

2.1 INSTALL THE W100 MODULE ONTO THE CUSTOMER'S BOARD

Please refer to the figure below. When attaching the module to the customer's board, make sure the module is securely installed on the evaluation board. After the module is installed, connect the power supply and serial device to the customer's board.



W100 default working mode is AP mode, you can use WEB or ConfigTool to configuration.

Default work mode (AP/STA) : AP mode

Default IP address: 192.168.1.1

Default Netmask: 255.255.255.0

Default Gateway: 192.168.1.254

3. CHOOSING THE PROPER OPERATION MODE

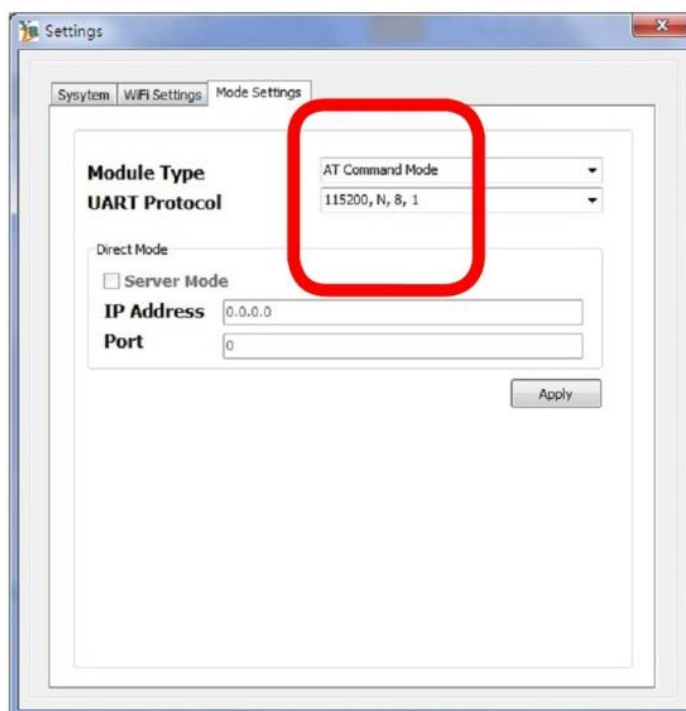
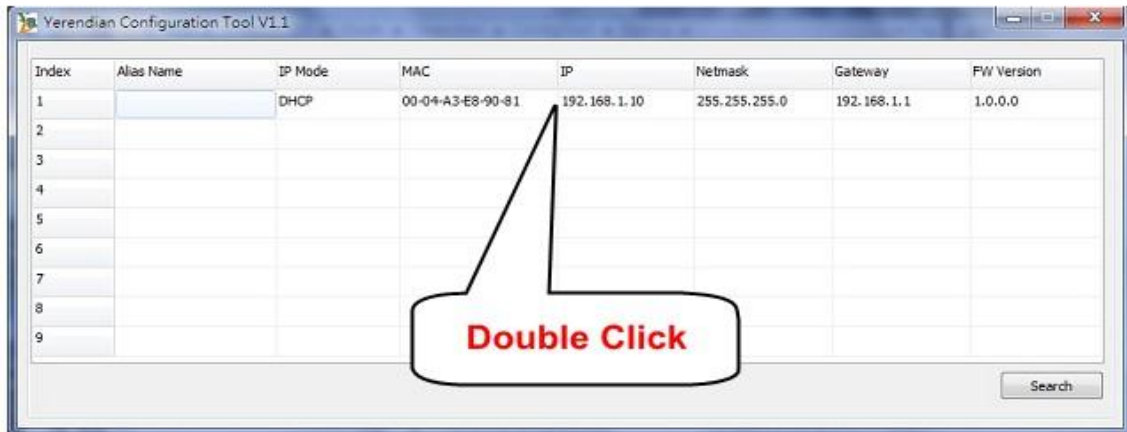
The W100 supports several tools for configuring the module. In this chapter we briefly describe the options available and appropriate situations for using those options.

The following topics are covered in this chapter:

- AT Command Mode (TCP Client)
- MODBUS Gateway Mode (TCP Server)
- Direct Mode (TCP Client)
- Direct Mode (TCP Server)

3.1 TCP CLIENT MODE (TCP CLIENT)

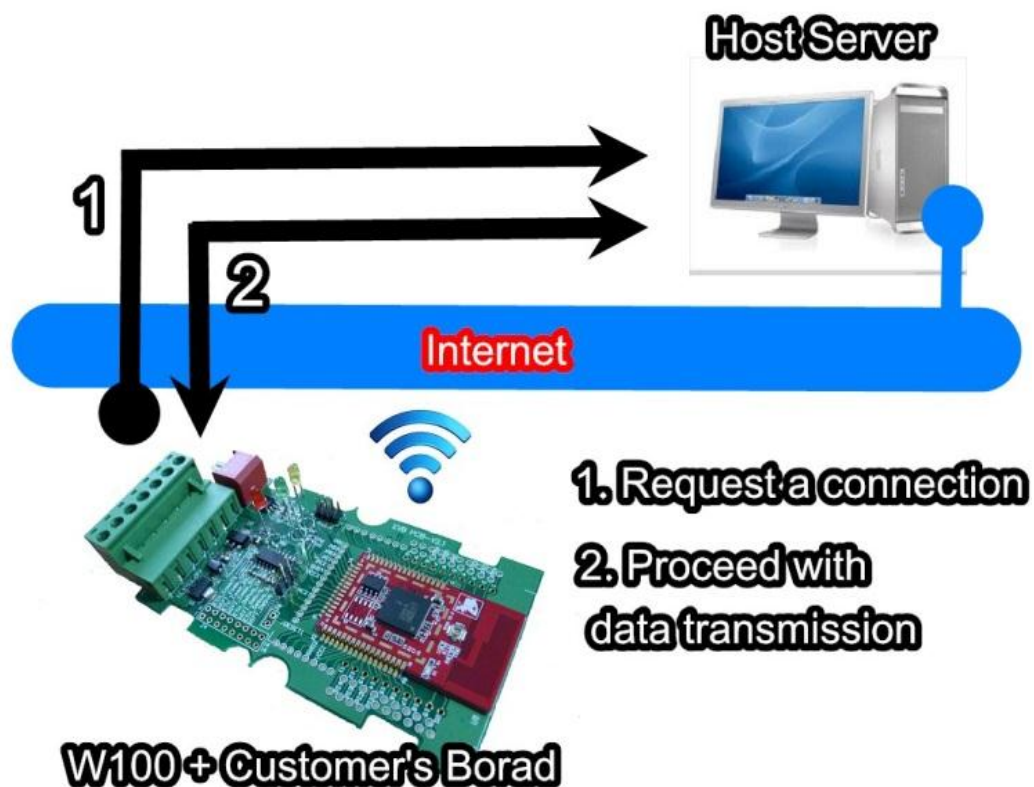
3.1.1 Using utility configuration:



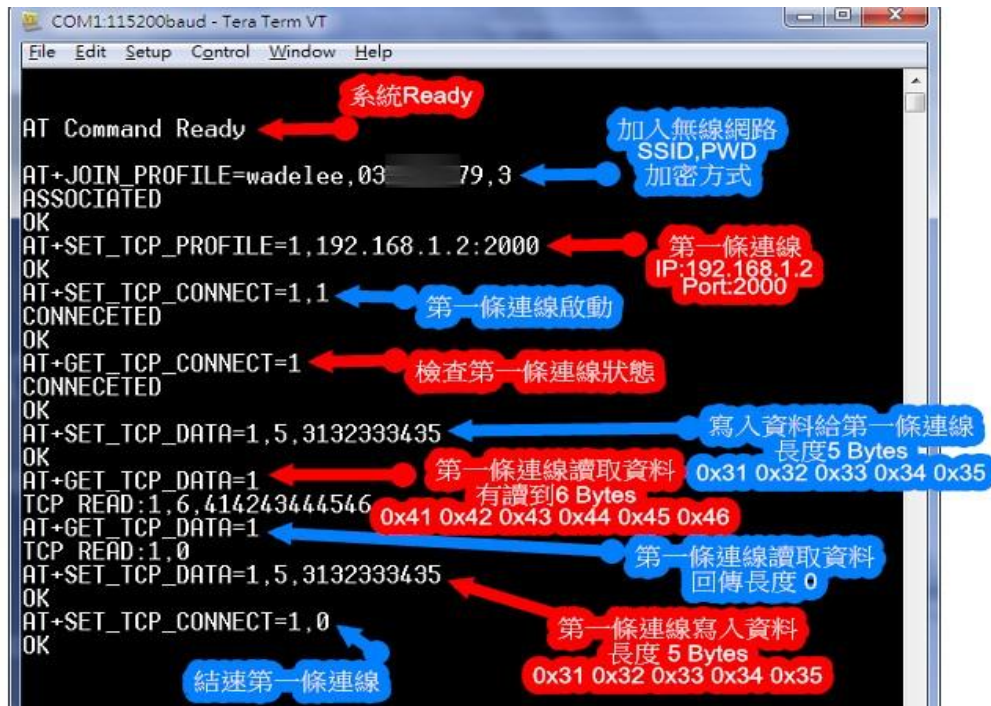
3.1.2 Using WEB console configuration:



3.1.3 Schematic diagram:



3.1.4 TCP client example:

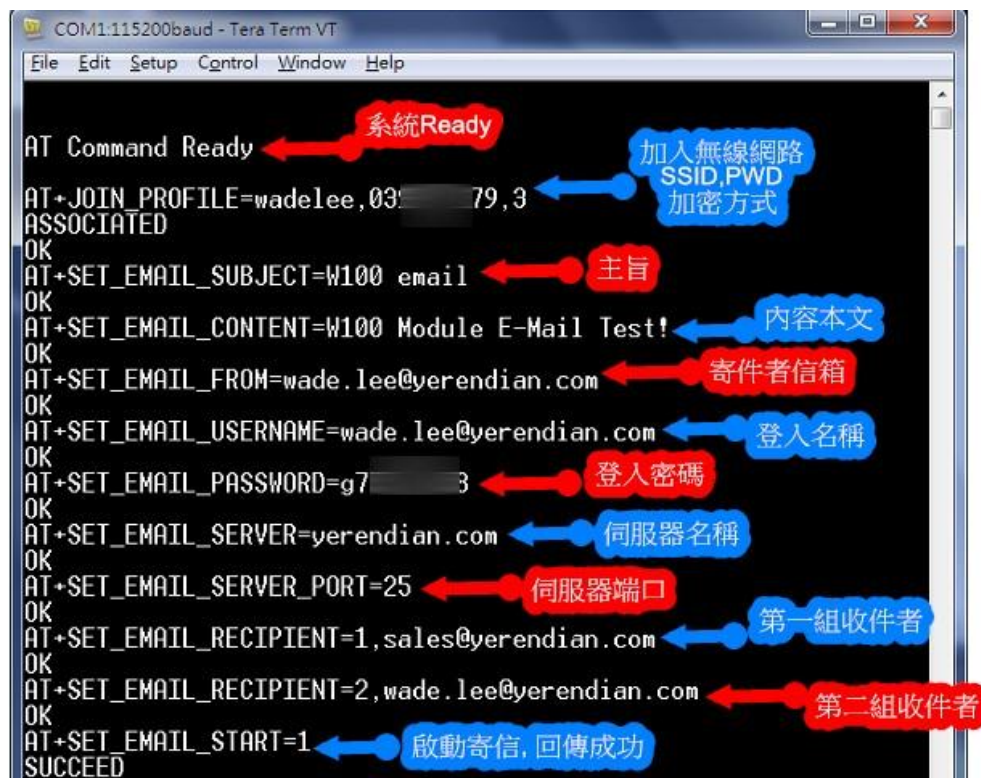


```

COM1:115200baud - Tera Term VT
File Edit Setup Control Window Help

AT Command Ready ← 系統Ready
AT+JOIN_PROFILE=wadelee,03 79,3 ← 加入無線網路 SSID,PWD 加密方式
ASSOCIATED
OK
AT+SET_TCP_PROFILE=1,192.168.1.2:2000 ← 第一條連線 IP:192.168.1.2 Port:2000
OK
AT+SET_TCP_CONNECT=1,1 ← 第一條連線啟動
CONNECTED
OK
AT+GET_TCP_CONNECT=1 ← 檢查第一條連線狀態
CONNECTED
OK
AT+SET_TCP_DATA=1,5,3132333435 ← 寫入資料給第一條連線 長度5 Bytes
OK
AT+GET_TCP_DATA=1 ← 第一條連線讀取資料 有讀到6 Bytes
TCP_READ:1,6,414243444546 ← 0x31 0x32 0x33 0x34 0x35 0x41 0x42 0x43 0x44 0x45 0x46
AT+GET_TCP_DATA=1 ← 第一條連線讀取資料 回傳長度0
TCP_READ:1,0
AT+SET_TCP_DATA=1,5,3132333435 ← 第一條連線寫入資料 長度5 Bytes
OK
AT+SET_TCP_CONNECT=1,0 ← 結速第一條連線
OK
  
```

3.1.5 E-Mail example:



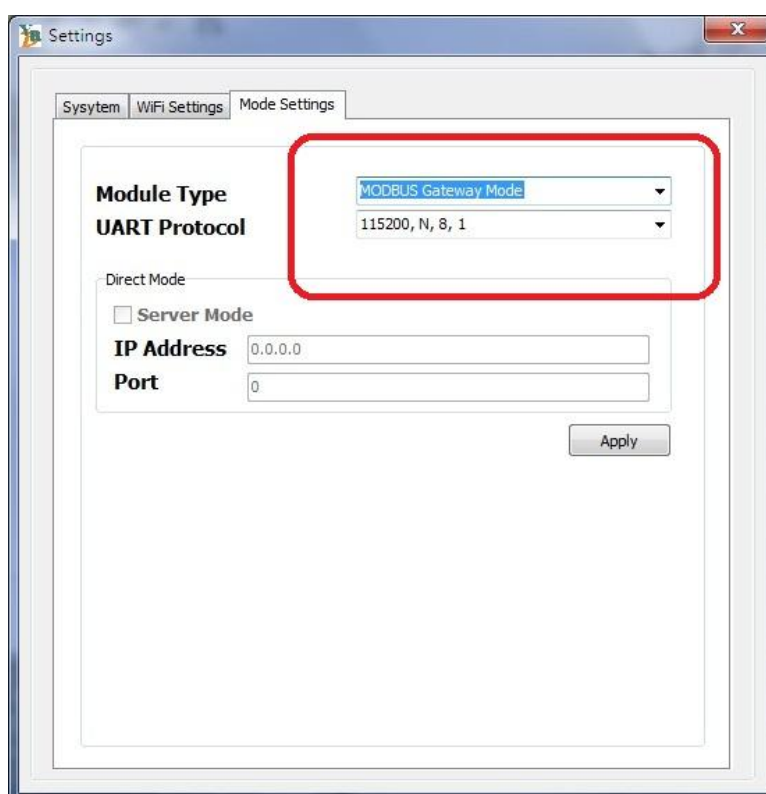
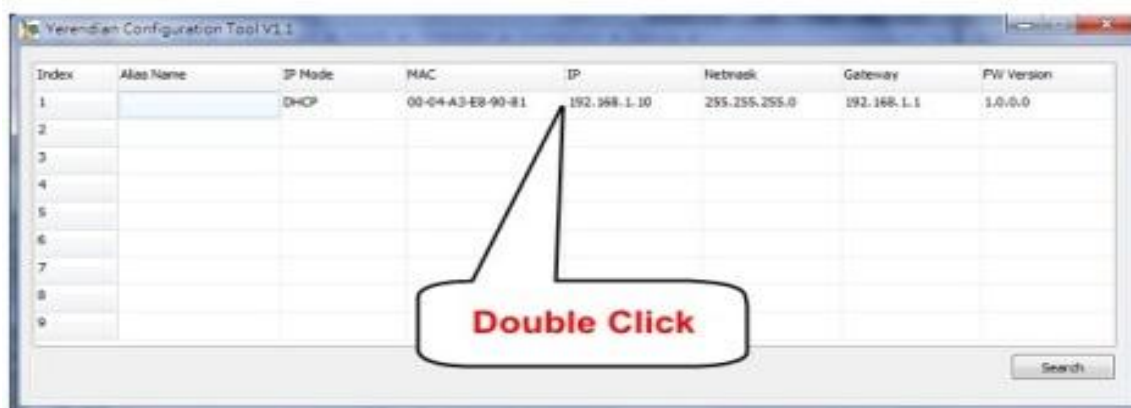
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COM1:115200baud - Tera Term VT
File Edit Setup Control Window Help

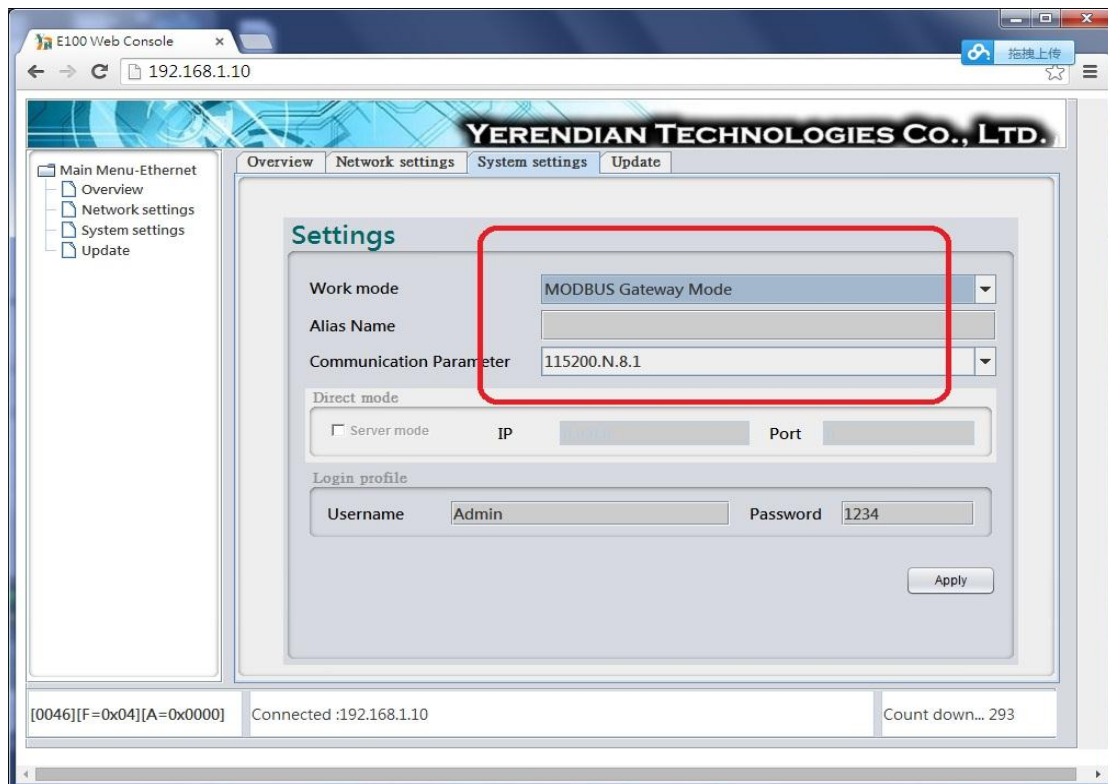
AT Command Ready ← 系統Ready
AT+JOIN_PROFILE=wadelee,03 79,3 ← 加入無線網路 SSID,PWD 加密方式
ASSOCIATED
OK
AT+SET_EMAIL_SUBJECT=W100 email ← 主旨
OK
AT+SET_EMAIL_CONTENT=W100 Module E-Mail Test! ← 內容本文
OK
AT+SET_EMAIL_FROM=wade.lee@yerendian.com ← 寄件者信箱
OK
AT+SET_EMAIL_USERNAME=wade.lee@yerendian.com ← 登入名稱
OK
AT+SET_EMAIL_PASSWORD=g7 3 ← 登入密碼
OK
AT+SET_EMAIL_SERVER=yerendian.com ← 伺服器名稱
OK
AT+SET_EMAIL_SERVER_PORT=25 ← 伺服器端口
OK
AT+SET_EMAIL_RECIPIENT=1,sales@yerendian.com ← 第一組收件者
OK
AT+SET_EMAIL_RECIPIENT=2,wade.lee@yerendian.com ← 第二組收件者
OK
AT+SET_EMAIL_START=1 ← 啟動寄信, 回傳成功
SUCCEED
  
```

3.2 MODBUS GATEWAY MODE (TCP SERVER)

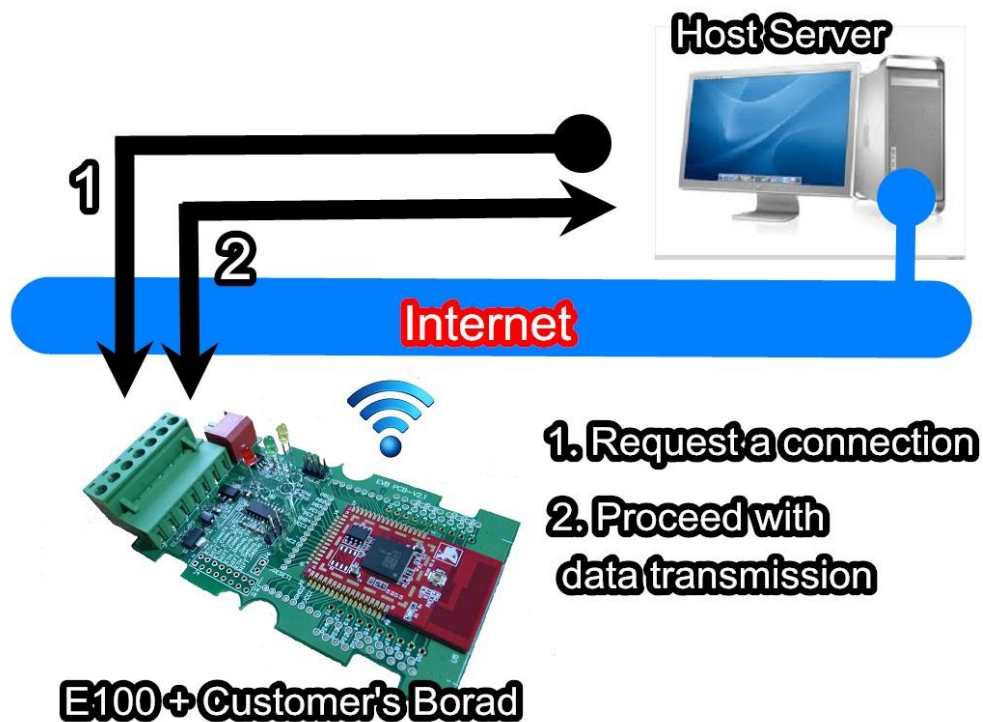
3.2.1 Using utility configuration:



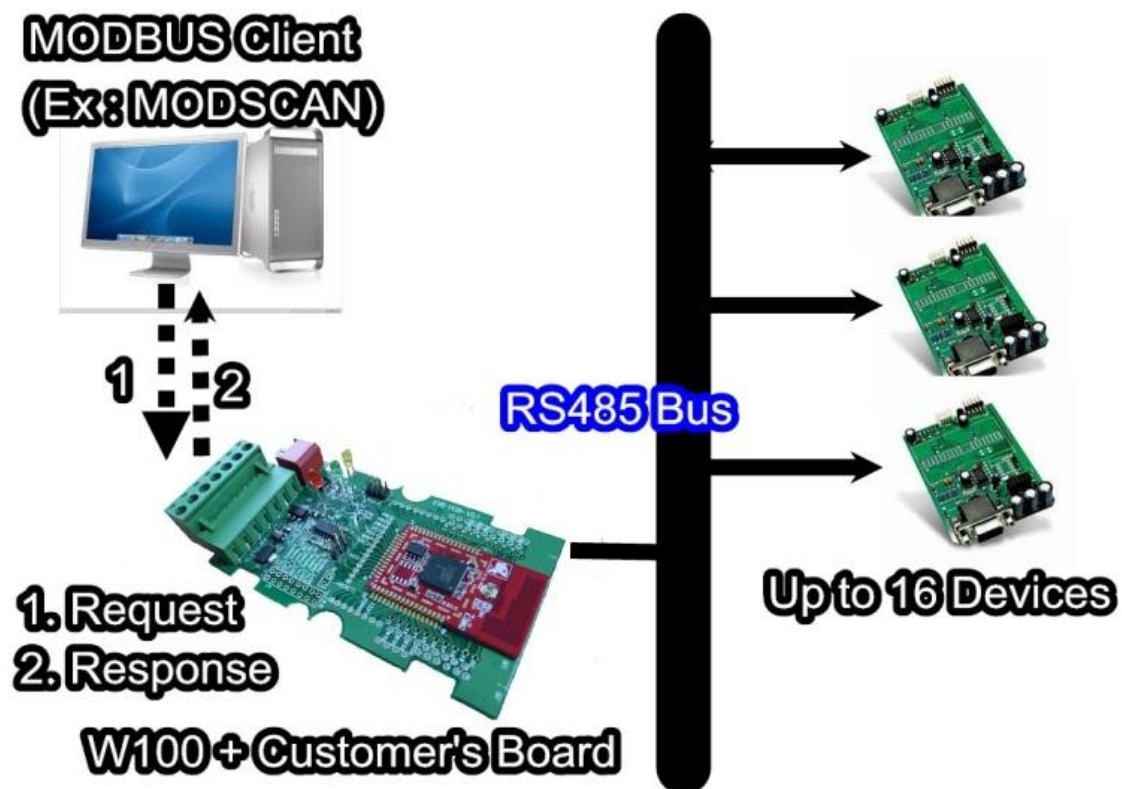
3.2.2 Using WEB console configuration:



3.2.3 Schematic diagram:

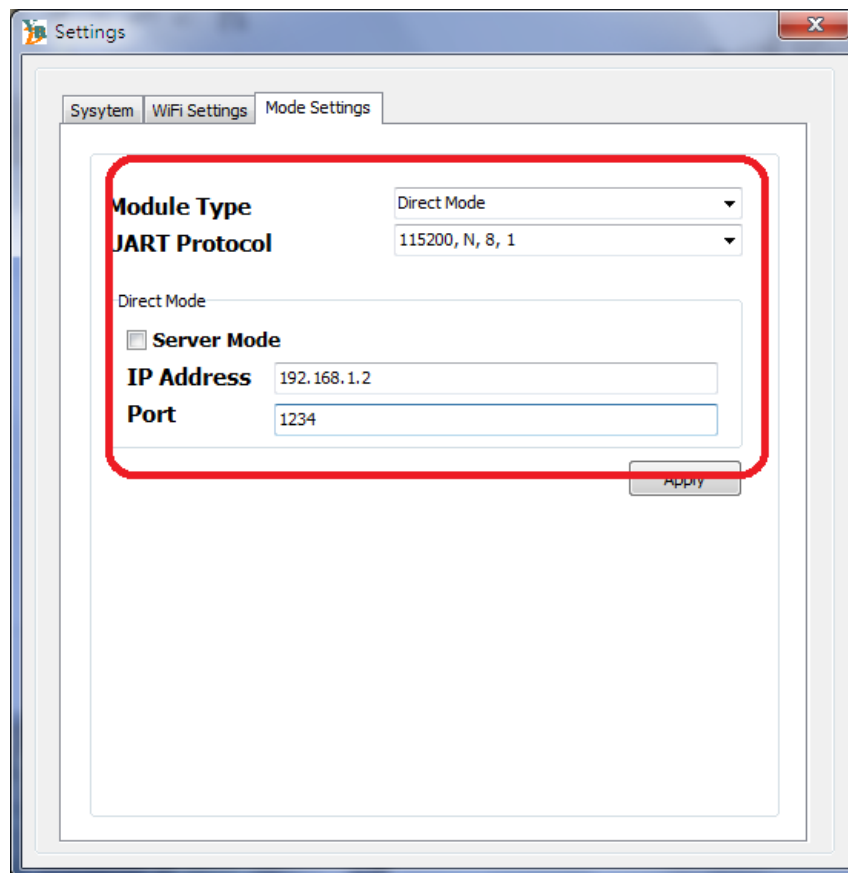


3.2.4 MODBUS gateway example:

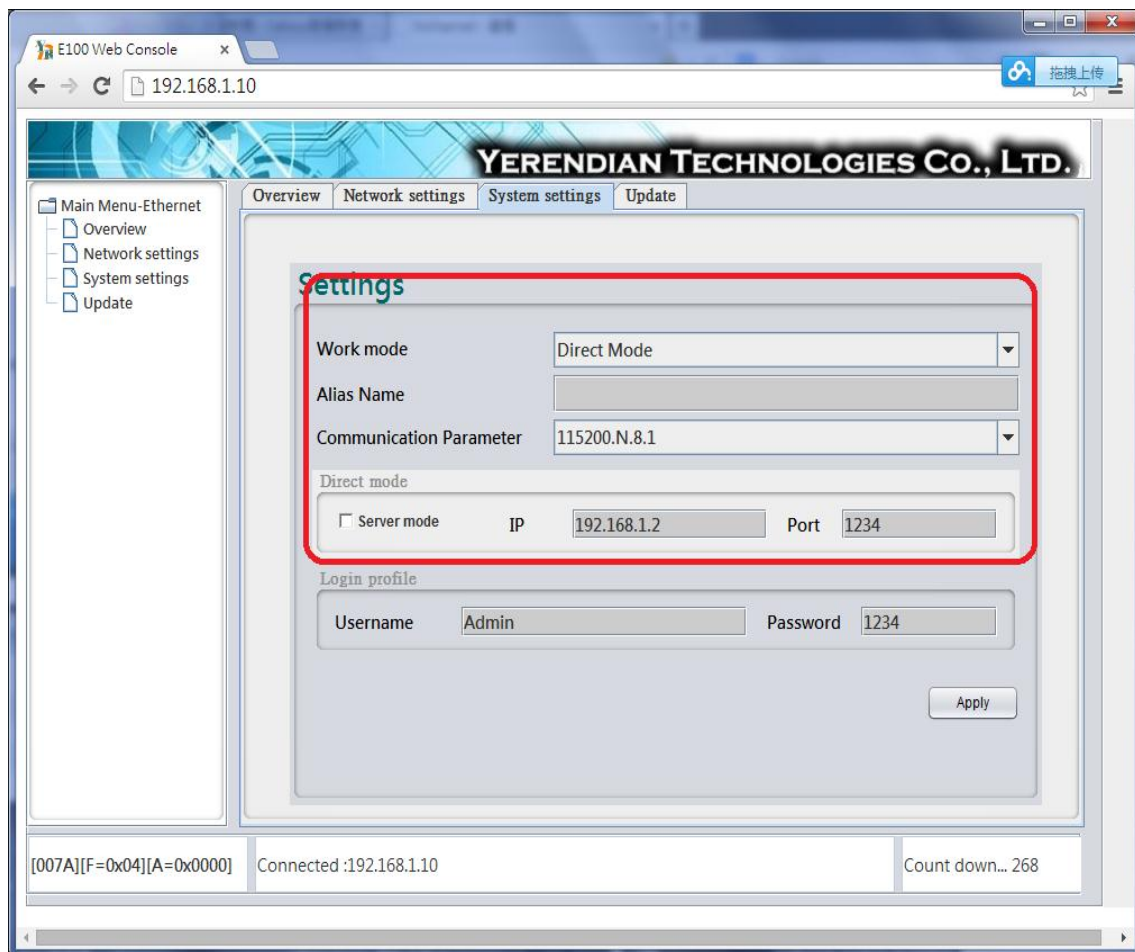


3.3 DIRECT MODE (TCP CLIENT)

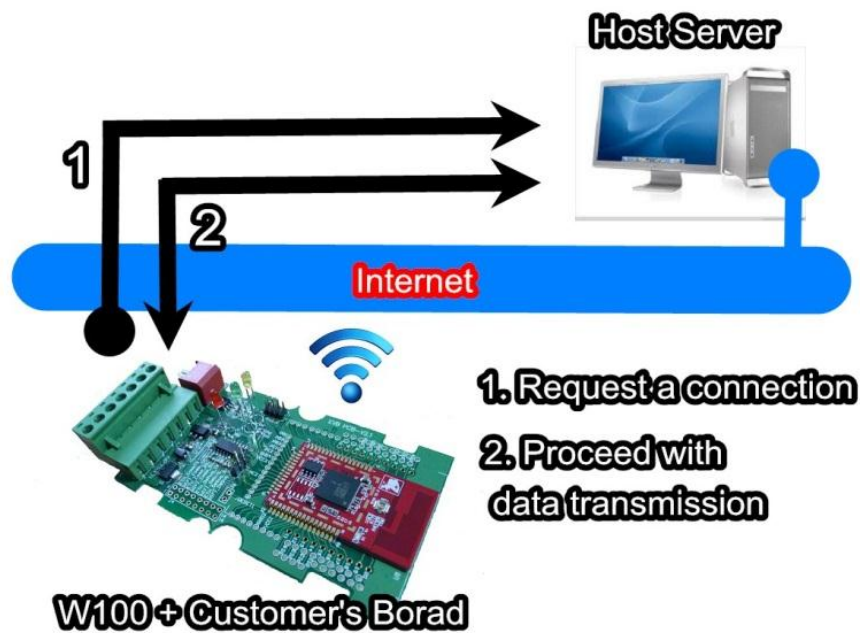
3.3.1 Using utility configuration:



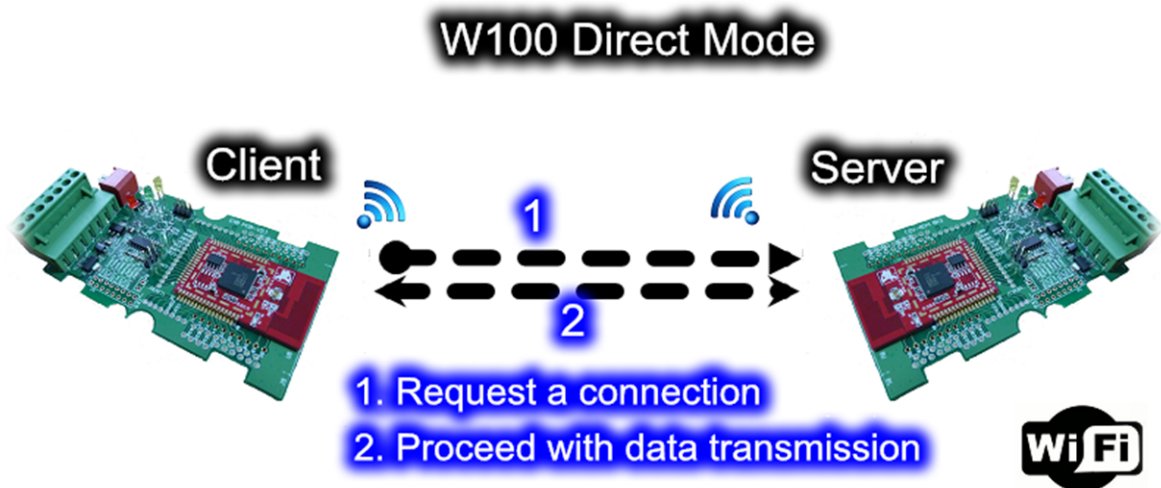
3.3.2 Using WEB console configuration:



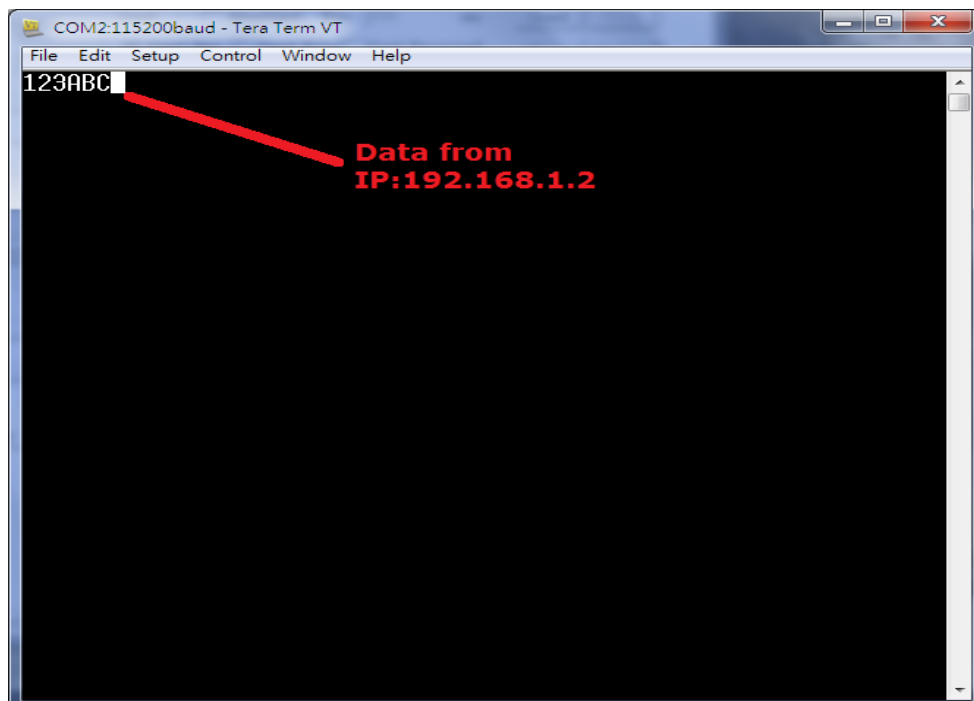
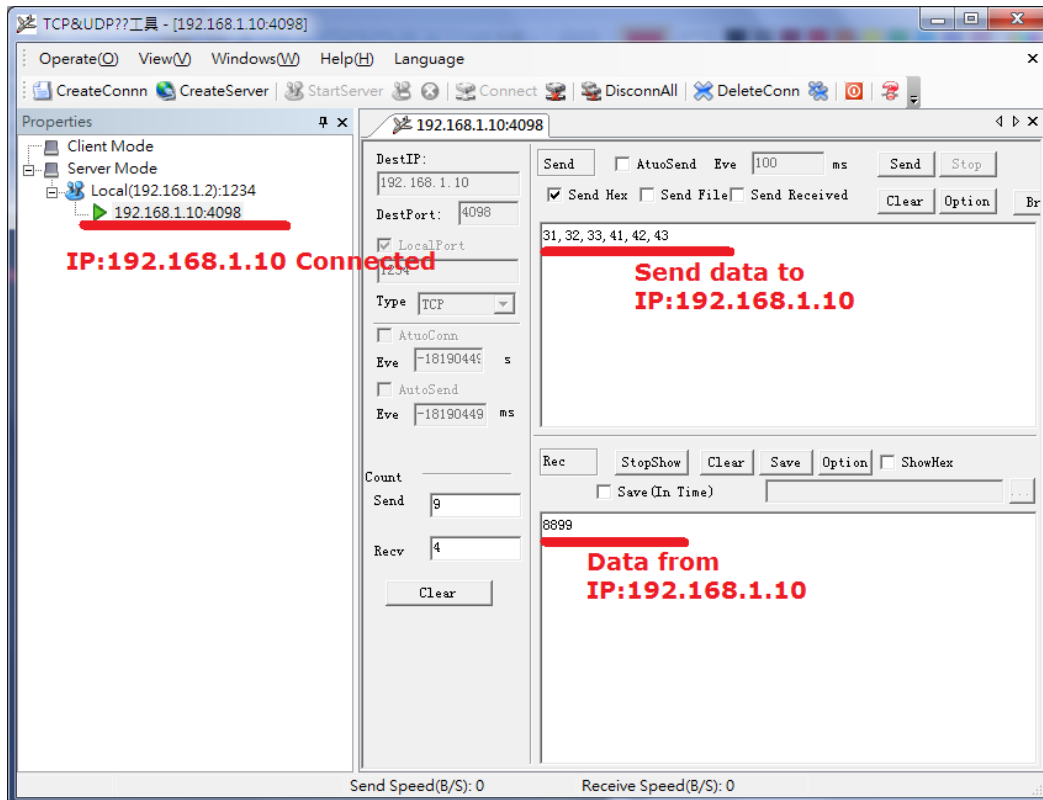
3.3.3 Schematic diagram-1:



3.3.4 Schematic diagram-2: (Replace the RS232 / RS485 cable then extend the distance)

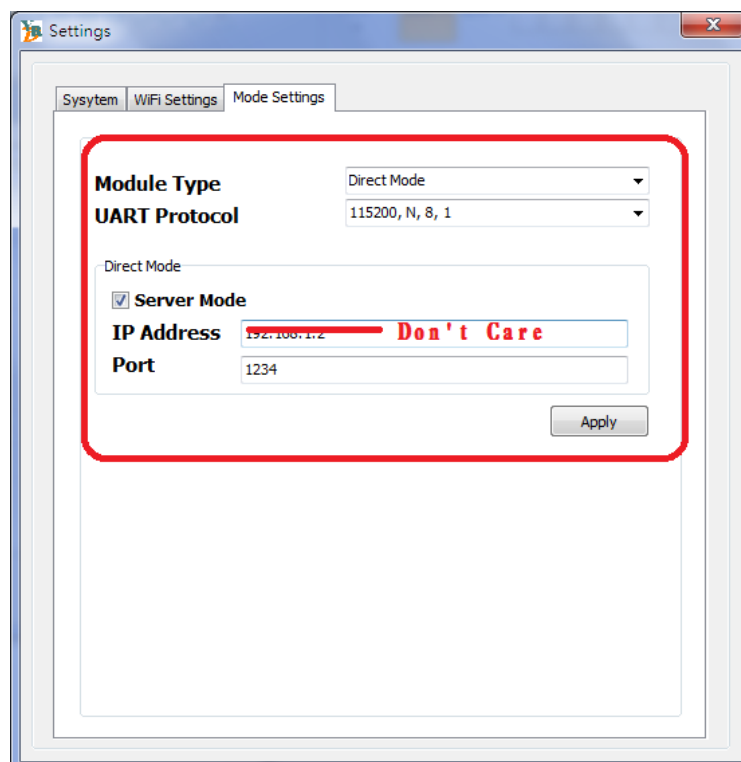


3.3.5 Direct mode TCP client example:

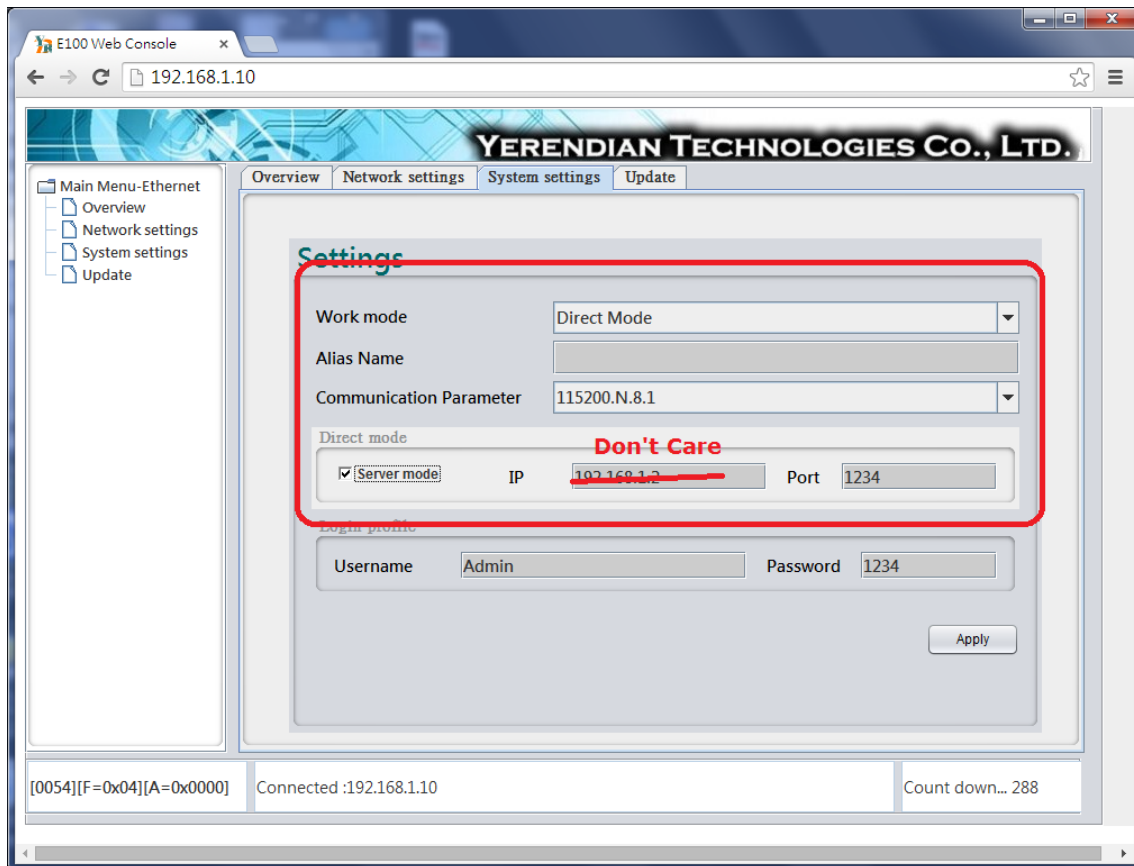


3.4 DIRECT MODE (TCP SERVER)

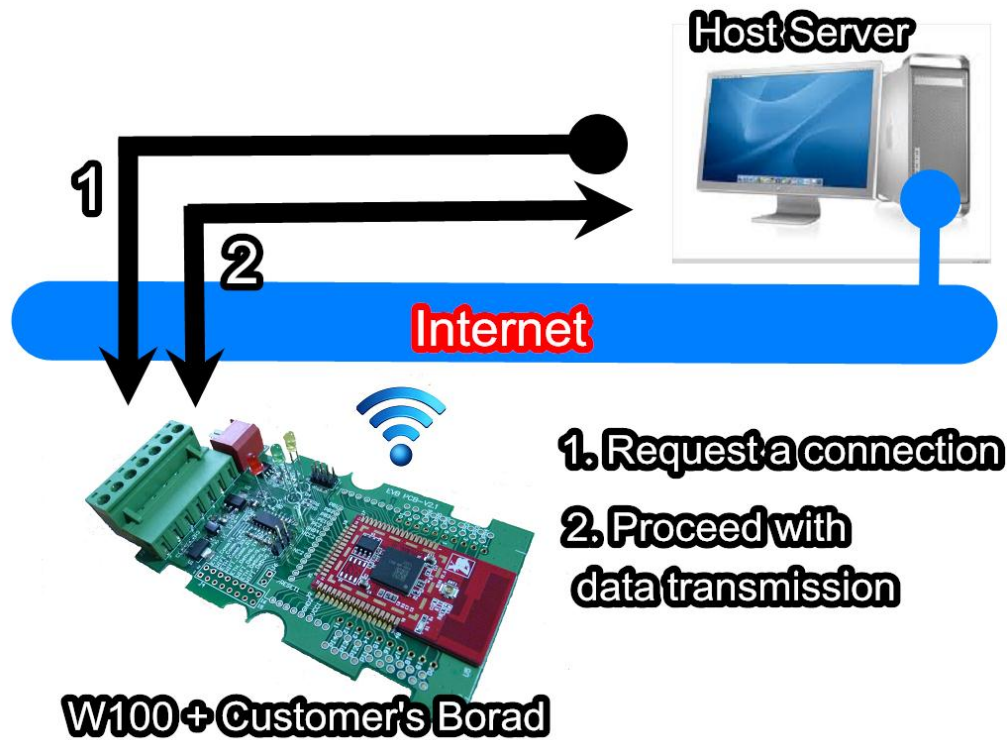
3.4.1 Using utility configuration:



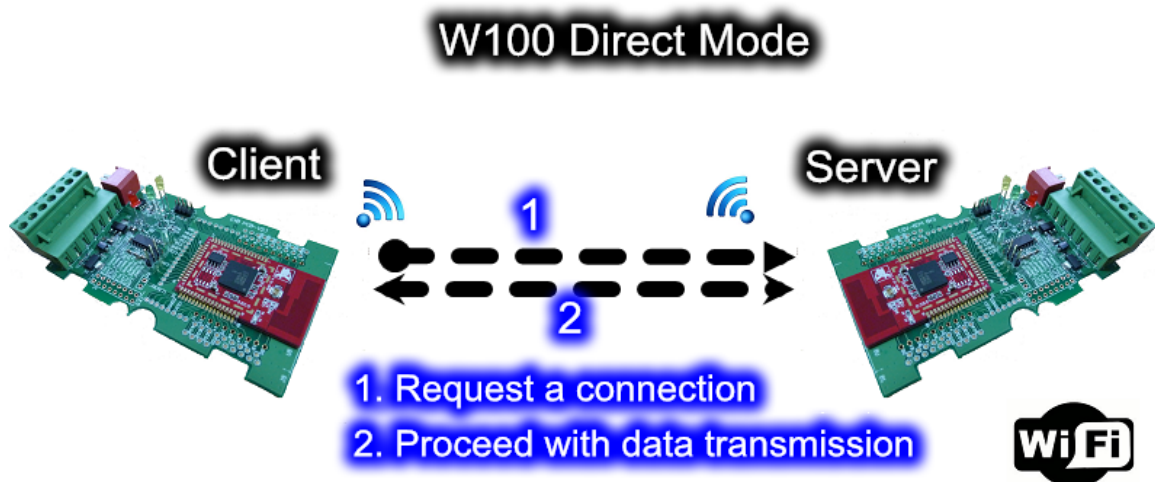
3.4.2 Using WEB console configuration:



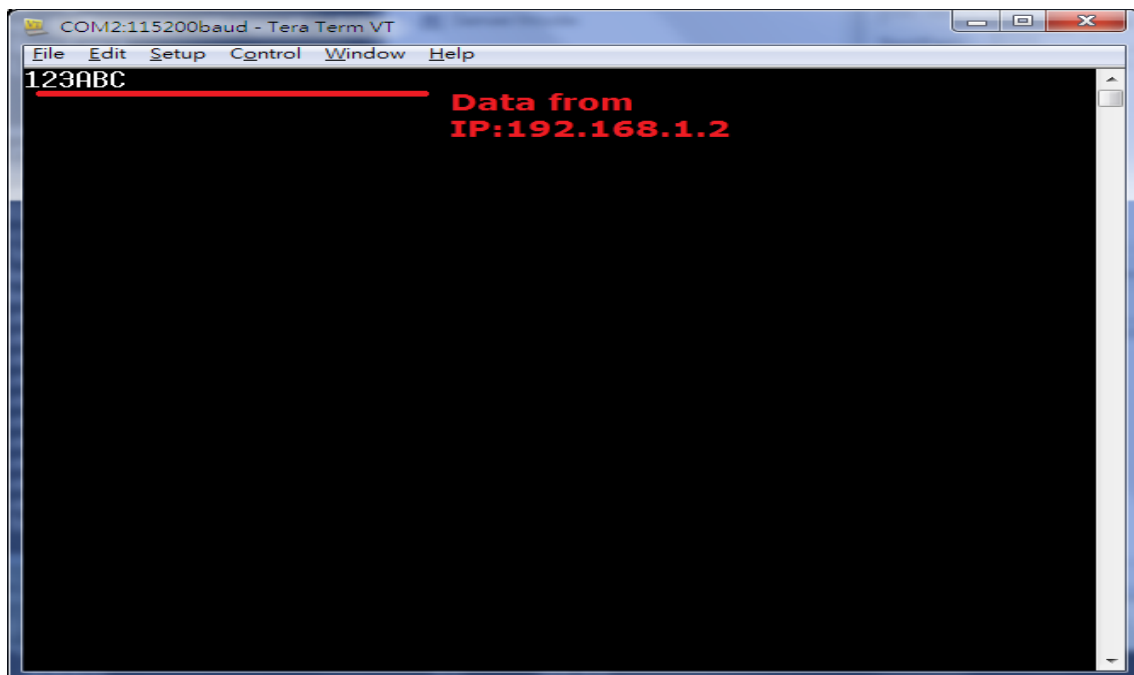
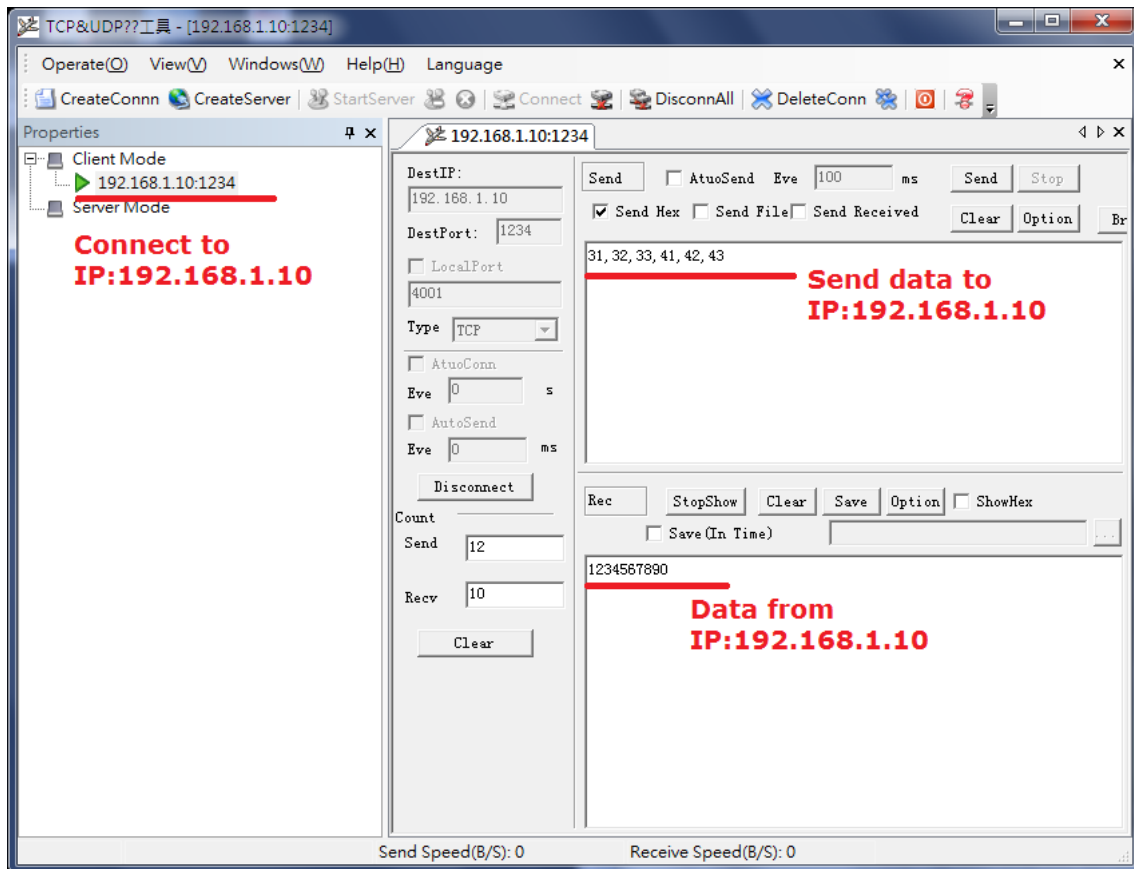
3.4.3 Schematic diagram-1:



3.4.4 Schematic diagram-2: (Replace the RS232 / RS485 cable then extend the distance)

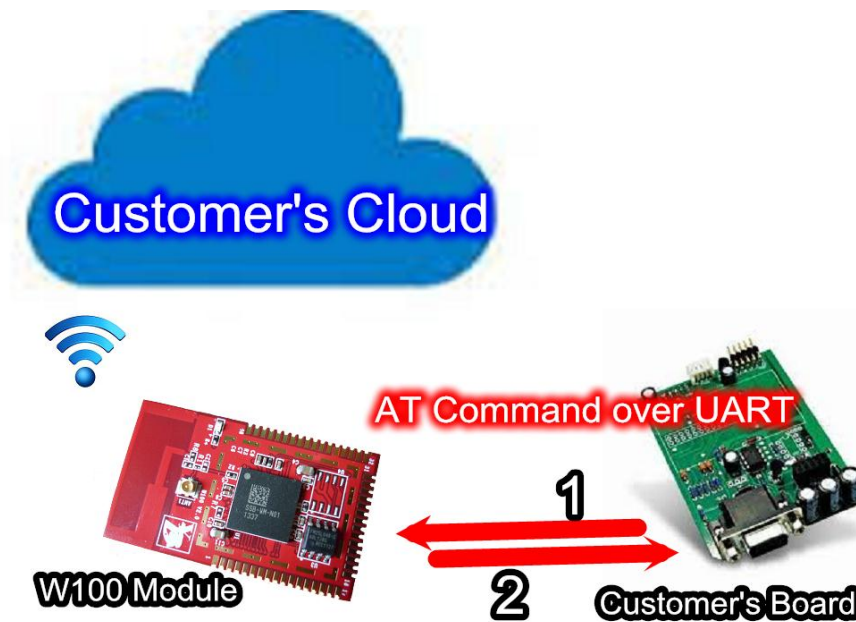


3.4.5 Direct mode TCP server example:



4. AT COMMAND SET GUIDE

The W100 supports EZ-AT Command for configuring the module. In order to communication each other between W100 and customer's board, we must use AT Commands. Figure 1.1 illustrates the interface.



Takes less than five AT commands then you can connect to the internet over WiFi.



4.1 AT COMMAND SET

- Please refer E100/W100 AT command guide document



5. TECHNICAL SUPPORT CONTACT

Yerendian Technologies Co., Ltd.

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Skype: hain-hai

Website: www.yerendian.com

APPENDIX A. WELL KNOW PORT NUMBERS

This appendix is included for your reference. Listed below are port numbers that already have a well-established use. These port numbers should be avoided when assigning a port number to your W100 module.

TCP Socket	Application Service
0	reserved
20	FTP data
21	FTP control
25	SMTP
37	Time server
53	DNS
80	HTTP
502	MODBUS server

UDP Socket	Application Service
0	reserved
53	DNS



69	TFTP
161	SNMP
162	SNMP traps
9000	Device Search
9001	Device Report

APPENDIX B. MODBUS MAP

MODBUS Map for W100

3xxx read only register (support function 4)

Reference	Address	Data Type	Description
30001	0x0000	1 word	<R>Ethernet link status 0: Disconnect 1: Connected
30257	0x0100	21 word	<R> Product name Ansi C string
30278	0x0115	2 word	<R> Product ID
30280	0x0117	2 word	<R>Firmware version
30282	0x0119	2 word	<R>Firmware Build Date
30285	0x011B	3 word	<R>MAC
30288	0x011E	1 word	<R>Total number of AP
30289	0x011F	19 word	<R>Report AP information

4xxx read/write registers (support function 3,6,16)



Reference	Address	Data Type	Description
40257	0x0100	1 word	<RW>IP mode 0: Static IP 1: DHCP
40258	0x0101	2 word	<RW>IP address Ex: 0xC0A80102 192.168.1.2
40260	0x0103	2 word	<RW>Subnet mask Ex: 0xFFFFF00 255.255.255.0
40262	0x0105	2 word	<RW>Gateway address Ex: 0xC0A801FE 192.168.1.254
40264	0x0107	2 word	<RW>DNS-1 Ex: 0xA85F0101 168.95.1.1
40266	0x0109	2 word	<RW>DNS-2 Ex: 0xA85F0101 168.95.1.1
40268	0x010B	1 word	<RW>Reset 1: Reset 0: Don't Care
40269	0x010C	1 word	<RW>Work mode 0: AT command mode 1: MODBUS gateway mode 2: Direct mode
40272	0x010F	1 word	<RW>Communication protocol 0: 2400 N,8,1 1: 4800 N,8,1

			2: 9600 N,8,1 3: 19200 N,8,1 4: 38400 N,8,1 5: 57600 N,8,1 6: 115200 N,8,1 7: 230400 N,8,1 8: 2400 E,8,1 9: 4800 E,8,1 10: 9600 E,8,1 11: 19200 E,8,1 12: 38400 E,8,1 13: 57600 E,8,1 14: 115200 E,8,1 15: 230400 E,8,1 16: 2400 O,8,1 17: 4800 O,8,1 18: 9600 O,8,1 19: 19200 O,8,1 20: 38400 O,8,1 21: 57600 O,8,1 22: 115200 O,8,1 23: 230400 O,8,1
40273	0x0110	8 word	<RW>Login user name



			Ansi C string
40281	0x0118	8 word	<RW>Login password Ansi C string
40289	0x0120	8 word	<RW>Alias name Ansi C string
40297	0x0128	1 word	<RW>Module working mode 0: AP mode 1: STA mode
40298	0x0129	1 word	<RW>Scan AP 0: disable 1: enable
40299	0x012A	1 word	<RW>AP index
40300	0x012B	20 word	<RW>Join SSID Ansi C string
40319	0x013F	20 word	<RW>Join password Ansi C string
40342	0x0155	1 word	<RW>Web console enable 0: disable 1: enable
40343	0x0156	1 word	<RW>direct mode (server /client mode) 0: client mode 1: server mode
40344	0x0157	2 word	<RW>direct mode IP address
40346	0x0159	1 word	<RW>direct mode port

